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Mobile learning (m-Learning) technology and the effect on the academic performance in science and health of grade 3 Pupils of Minas Elementary School

John Edgar S Anthony [1*], Randy A Quitain [2]
[1-2] Mindoro State University, Oriental Mindoro Philippines

* Corresponding Author: **John Edgar S Anthony**

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Abstract
Philippine Educational System has been traditional but gradually changing to cater the demands of the new generation. Before this "new normal" came to light, teachers and learners are already using the internet, computer, and other technologies in education. But the difference lies between having a face to face class and classes done virtually as the public health crisis intensified due to COVID-19 pandemic. Considering the different alternatives of delivering instructions and content to learners, the use of mobile learning (m-Learning) technology is one of the options to reduce the study gap of the learners in this time of pandemic. This study focused on the use of mobile learning technology to enhance level of performance of grade 3 pupils in Science and Health and how it influenced pupils' performance. By using a quasi-experimental research method, the following results are generated: 1) the method positively improved the performance in Science and Health of the control and experimental groups; 2) while effectiveness assessment showed a highly effective result; and 3) the application of the method showed a positive impact on the participants as shown by their positive perception of the Science and Health subject.

Keywords: Mobile Learning, Academic Performance, Science and Health

Introduction

For years, Philippine Educational System has been traditional but gradually changing to cater the demands of the new generation. Before this "new normal" came to light, teachers and learners are already using the internet, computer, and other technologies in education. But the difference lies between having a face to face class and classes done virtually as the public health crisis intensified due to COVID-19 pandemic.

In response, The Department of Education introduced modalities of how learning shall be delivered in the "new normal". These are Distance Learning, Blended Learning and Homeschooling, respectively. The public and private schools ensure their readiness to implement flexible learning as an alternative to traditional classroom learning. This includes having their lessons through radio, television, or cellular phones as what is applicable in the area. However, it is indicated that mobile learning (mLearning) cannot replace with formal education but offers methods to support learning outside of the classroom and brings advantages for different interactions (Sharples, Taylor & Vavoula, 2010).

Considering the different alternatives of delivering instructions and content to learners, the use of mobile learning (mLearning) technology is one of the options to reduce the study gap of the learners in this time of pandemic. In connection with the use of mobile devices in learning and teaching activities, emerged the term "Mobile Learning". Mobile learning is defined and varied over time and is affected by the emerging technologies. The advantages of mobile learning include ease of operations, flexibility of usage, and immediacy of information acquisition.

Under this pandemic, educational institutions are presented with surmounting challenges in its education system. The COVID-19 will have an impact on the educational provision. Hence, there will be a drop especially in academic performance of the learners. This critical situation brings to light many concerns such as deterioration of the quality of education and the future of the students (Usak, *et.al*, 2020).

Then, there is a greater need for educational institutions to strengthen the practices in the curriculum and the use of innovative teaching techniques and approaches will be a paramount importance (Toquero, 2020).

Generally, mobile learning helps pupils to develop technological skills, conversational skills, find answers to their questions, develop a sense of collaboration, allow knowledge sharing, and hence leverage their learning outcomes (Al- Emran, *et.al*, 2016).

The circumstances of confinement caused by the pandemic, and to ensure continuity of teaching to learners, this study will be a tool to reveal the effects of mobile learning (mLearning) technology on the academic performance in Science and Health among Grade 3 pupils of Minas Elementary School.

Objectives of the Study

This study aims to investigate the effect of mobile learning (mLearning) technology on the academic performance in Science and Health of Grade 3 Pupils of MinasElementary School. Specifically, this study sought to: 1) Describe the performance level of the pupils on the control and experimental group before and after the experiment. 2) Assess the effectiveness of mobile learning. 3) Determine the effect of mobile learning on academic performance in Science and Health of Grade 3 pupils of Minas Elementary School.

Materials and Methods

The method used in this research is the quasi-experimental. It involves the creation of comparison of groups- the experimental group and the control group. The experimental group is the subject that is manipulated or exposed to instructional intervention after which an intended outcome is observed and the control group was used as a baseline measure in which it is similar on experimental group in terms of their grade level and mental ability such that it does not receive the treatment or the experimental manipulation that the treatment group receives.

In this design, one group is given the treatment and the other receives no treatment over the same period of time but undergoes exactly the same tests. A teacher-made test was administered to both treatment and control groups in order to determine the pupils' level of performance before the conduct of the study.

Data Collection Procedure

The researcher asked permission from the school head of the respondents' school to gather data on pupils' performance in grade three level in Science and Health for school year 2020-2021. Then, the researcher did the purposive sampling process on the Grade 3 pupils based from the records of the teacher. Upon the approval, the researcher conducted the study among the respondents.

Data Analysis

To describe the pupils' performance level in Science and Health before and after the experiment of mobile learning, the frequency counts and the level of proficiency assessment tools is used. The performance level assessment used is the standardized- based assessment tool. The performance of the pupils was described in terms of the following:

1. To assess the effectiveness of mobile learning method on the performance level of Grade 3 pupils in Science and Health, the t-test for independent variable was used for the comparison of post-test of two samples.
2. To determine the impact of mobile learning method on the pupils' performance the t-test for the dependent variable was applied on experimental group.

Results and Discussion

Pre-test of Control Group

Figure 1 shows the pupils' performance level in Science and Health during their pre-examination of control group is distributed as follows: only 2 out of 30 pupils or 7% had a developing proficiency level; and 28 out of 30 pupils or 93% had a beginning proficiency level and no one achieved the advance level of performance. It shows that most of them got very low scores during their pretest. This concludes that most of them have poor performance level in Science and Health during pretest.

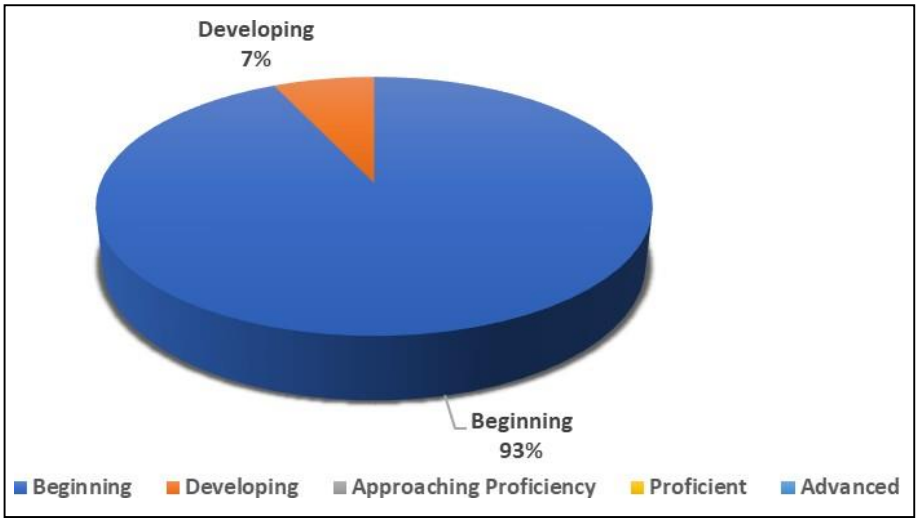

Fig 1: Pupils' Performance Level on Pretest (control group)

Pre-test of Experimental Group

As gleaned out in Figure 2, the students' performance level in Science and Health under experimental group during their pre-test examination is distributed as follows: only 1 out of 30 or 3% had a developing proficiency level; and 29 out of 30 pupils or 97% of the total population had a beginning proficiency level and no one of this group reached the advance level and even the proficiency level of performance. The result of the test clearly revealed that the majority of the respondents of both groups have not arrived at the expected competency in their subject.

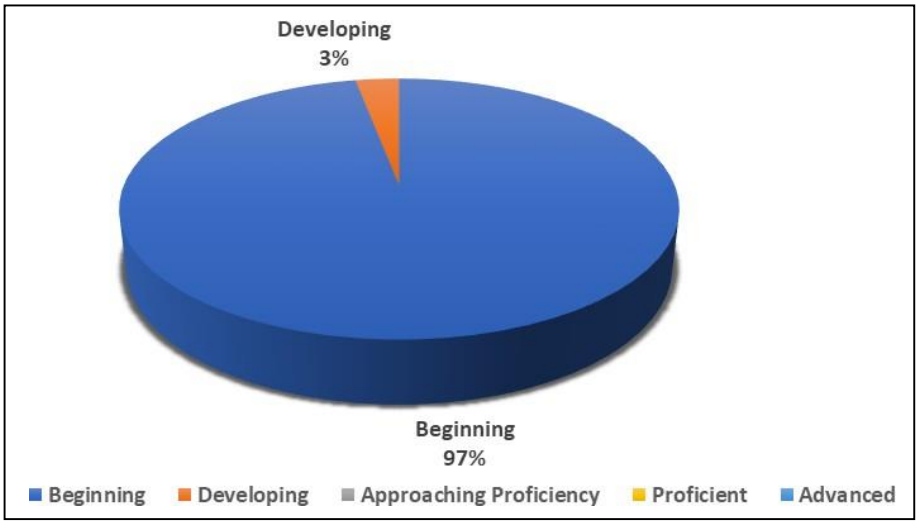

Fig 2: Pupils' Performance Level on Pretest (experimental group)

Post-test of Control Group

As shown in Figure 3, the pupils' performance level in Science and Health as a result of their post examination is distributed as follows: 7 or 23% had a beginning proficiency level; 18 or 60% had a developing proficiency level; and 5 or 17% had an approaching proficiency level. The given data above figure out that most of the respondents under control group attained the developing proficiency level of performance. The result shows that there is a big percentage on the population belonging to beginning proficiency level. This also implies that even though teaching and learning process occurred, the result shows that most of them reached only the developing proficiency stage in which it visualized lacking of skills. It is also revealed that no one of them attained the proficient and advance level in the performance level on their post examination.

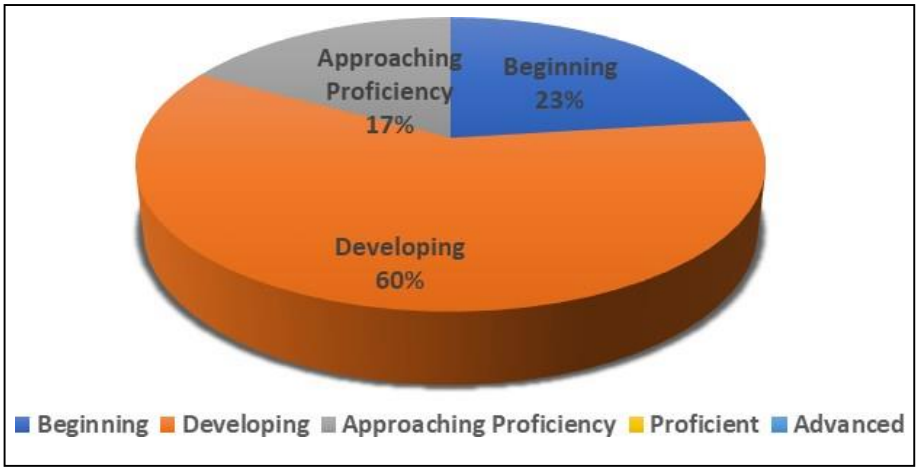

Fig 3: Pupils' Performance Level on Post-test (control group)

Post-test of Experimental Group

As illustrated in Figure 4, the pupils' performance level in Science and Health during their post examination is distributed as follows: 1 or 3% had a beginning proficiency level; 8 or 27% had a developing proficiency level; and 20 or 67% had an approaching proficient level; 1 or 3% had a proficient performance level. Most of them had an approaching proficiency level in Science and Health during post examination.

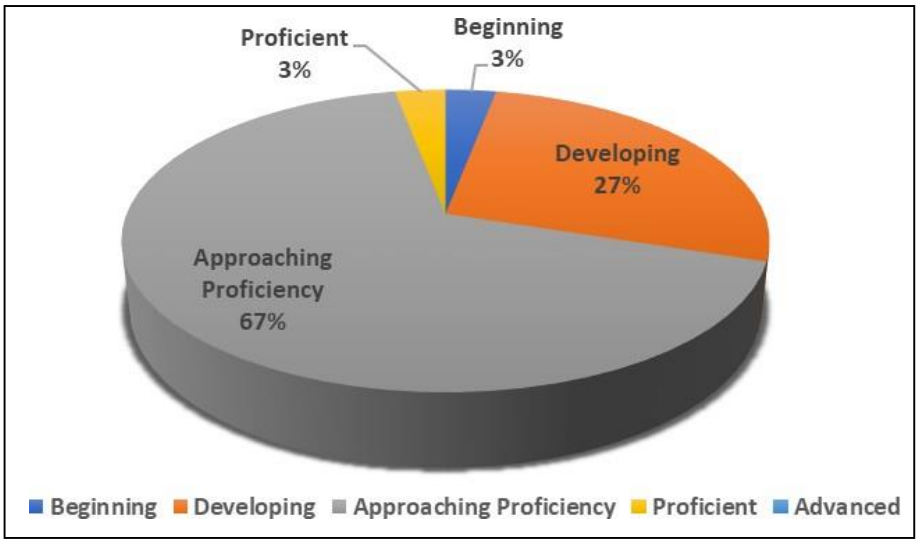

Fig 4: Pupils' Performance Level on Post-test (experimental group)

Effectiveness of Mobile Learning

Result of Compared Pretest of Experimental and Control Group Using t-test+

The table shows the result of pre-test of experimental and control groups.

Table 1

Test	t-value	t-critical	Interpretation
Pretest	1.33	1.99	Not significant

During pre-test of the group, the computed t-value is 1. 33 while the critical value is 1.99 at the 0.05 level of significance. The t-value is less than the critical value that signifies that there is no significant difference between the means pre-test performance of the two groups of students before the intervention. It means that two groups are comparable that they are similar in level when referring to the learning competency that they learned during the previous year of their study. This also implies that they had the same level of performance before the treatment.

The result of pre-test of both groups in their scores conveys that they need more attention in terms of their academic performance and innovative instruction because the result of data served as a basis to determine that they belong to the low performing pupils.

Result of Compared Post-test of Experimental and Control Group Using t-test

Table below shows the results of post-test of both groups wherein the computed t-value is 6.60 and the t-critical value is 1.99. Since the t-value is greater than the critical value, it implies that there is a statistical significant difference between the means post-test performance of the two groups of pupils. It reveals that in mobile learning, the performance of experimental group was further improved than the control group.

Table 2

Test	t-value	t-critical	Interpretation
Post-test	6.60	1.99	Significant

Score Difference of Pretest and Post-test of Respondents Using t-test

The table below shows that computed t-value of the difference of score of pre-test and post-test of two groups is 5.11 which are greater than the value of t-critical which is 1.99. Even if both groups received different instructional treatment, it shows that there is a statistical significant difference between the scores in pre-test and post-test of the respondents in which it manifested that there is a big improvement in terms of academic performance in Science and Health of experimental group.

Table 3

Test	t-value	t-critical	Interpretation
Pretest	5.11	1.99	Significant

Impact of Mobile Learning on the Pupils' Performance in Science and Health

Results of the Pretest and Post-test of Control Group Using t-test

The table summarized the result of pre-test and post-test of control group. The computed t-value of control group is 14.40. Since the t-value is greater than the critical value; it implies that there is a statistical significant difference between the means pre-test and post-test performance of control group of pupils after intervention. It implies that there is a progress of the performance of this group after the given intervention. It affects the performance of group in which there was an instructional treatment during the period of the study.

Table 4

Respondent	t-computed	t-critical	Interpretation
Control	14.40	2.02	Significant

Results of the Pre-test and Post-test of Experimental Group Using t-test

The result of pre-test and post-test of experimental group presented below summarized that the computed t-value which is 16.10 is greater than the critical value which is

2.02 where in it signifies that there is a significant difference between the performance of experimental group before and after the treatment.

The results show that the performance of the pupils has a better improvement using mobile learning as teachers' instructional method in teaching Science and Health.

Positively, through comparison of pre-test and post-test and the corresponding proficiency level of experimental group, it is proven that using mobile learning technology has a big impact on the part of the respondents.

Table 5

Respondent	t-computed	t-critical	Interpretation
Experimental	16.10	2.02	Significant

Conclusion and Recommendation

This study aimed at determining the effectiveness of mobile learning on academic performance level of two groups of grade 3 pupils in Science and Health at Minas Elementary School during school year 2020-2021. It found that majority of the respondents of both groups have poor performance level in Science and Health during pre-examination and majority of the respondents had an approaching proficiency level in Science and Health during post examination.

Furthermore, the result indicates there is a statistical significant difference between the means post-test performance of the two groups of pupils in which revealed that using mobile learning technology, the performance of experimental group was further improved than the control group.

The result of this survey research also shows that there is a statistical significant difference between the scores in pre-test and post-test of the respondents in which it manifested that by using mobile technology, there is a big improvement in terms of pupils' academic performance in Science and Health.

Positively, through comparison of pre-test and post-test and the corresponding proficiency level of experimental group, it is proven that using mobile learning technology has a big impact on the part of the respondents.

Based from the findings, it is recommended for teachers that mobile learning technology should be applied during instruction in Science and Health in this time of pandemic. Curriculum guide provided to all teachers may be improved focusing on teaching and learning process where using mobile learning technology is integrated in difficult topics. Also, trainings on procedure and development of materials for mobile learning method may be conducted to open the awareness of teachers and students on this kind of teaching and learning strategy.

Similar studies may be conducted by future researcher for other subjects or to other respondents having different characteristics.

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